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The Mediatory Role of Maladaptive Schema Modes between Parental Care and Non-Suicidal Self-Injury

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THE MEDIATORY ROLE OF SCHEMA MODES BETWEEN PARENTAL CARE
AND NON-SUICIDAL SELF-INJURY

ABSTRACT

Non-suicidal self-injury (NSSI) is being increasingly recognised as a behaviour of significant clinical importance. Yet, there remains uncertainty regarding the underlying mechanisms of NSSI. The present study aimed to explore the relationship between maladaptive schema modes, parental bonding and NSSI. 70 psychiatric outpatients with a history of NSSI completed the Deliberate Self-Harm Inventory, Schema Mode Inventory and Parental Bonding Inventory. Results revealed that maladaptive schema modes were significantly associated with low parental care and with an earlier age of onset, longer duration and higher number of methods of NSSI. Maladaptive schema modes also significantly mediated the relationship between parental care and age of onset of NSSI and between parental care and duration of NSSI. Two maladaptive schema modes (namely, Punitive Parent and Angry Child) were also found to be significant mediators in this relationship. The clinical implications of this research are discussed.

Key words: Schema Therapy, Self-Mutilation, Deliberate Self-Harm, Self-Injury,
Parental Bonding

INTRODUCTION

‘Non-suicidal self-injury’ (NSSI) is defined as ‘the direct, deliberate destruction of one’s own body tissue in the absence of suicidal intent’ (Nock & Favazza, 2009). NSSI constitutes a collection of behaviours of which skin-cutting is the most common (Hawton, Rodham, Evans & Weatherall, 2002; Horrocks, Price, House & Owens, 2003). The estimated rate of NSSI in Great Britain is between 4.6% and 6.6% (Meltzer, Lader, Corbin, Singleton, Jenkins et al., 2002) although this is likely to be an under-estimation since many individuals with NSSI never present to medical services (Hawton et al., 2002). NSSI has been reported as most common in adolescence and young adulthood (Meltzer et al., 2002) with 13.8% of 15-16 year olds reporting a history of self-injury (O’Connor, Rasmussen, Miles & Hawton, 2009). In contrast, Draper (1996) has reported that only 5% of reported episodes of self-injury are by people over 65. NSSI presentations in health-care are more commonly seen in women (Schmidtke, Bille-Brahe, DeLeo, Kerkhof, Bjerke, Crepet et al., 1996) although there is some evidence to suggest that it may be as common in men as in women (Gratz, 2001; Klonsky, Oltmanns & Turkeimer, 2003).

A number of psychiatric diagnoses have been associated with NSSI. The most common is borderline personality disorder (BPD) with approximately 80% of individuals with this diagnosis engaging in self-injurious behaviour (Shearer, Peter, Quaytman & Wadman, 1988). Yet it is clear that NSSI is a transdiagnostic phenomenon with concurrent diagnoses including mood disorders, anxiety disorders, eating disorders, dissociative disorders, disruptive behaviour disorders, psychotic disorders, substance misuse disorders and other personality disorder pathology (e.g. Farber, 1997; Guertin, Llyod-Richardson, Spirito, Donaldson & Boergers, 2001; Meltzer et al., 2002).

NSSI is also associated with a number of psychological characteristics. This includes the tendency to experience negative emotions as more intense, (Gratz, 2006) difficulties expressing emotions (Gratz, 2006; Pavio & McCulloch, 2004), somatic complaints (Bruner, Parzer, Haffner, Steen, Roos et al., 2007), anxiousness (Brown & Williams, 2007), low mood (Fliege, Kocalevent, Walter, Beck, Gratz et al., 2006), aggressiveness (Brown & Williams, 2007), impulsivity (Herpetz, Sass & Favazza,

1997) dissociation/derealisation (Zlotnick, Mattia & Zimmerman, 1999), low self-esteem (Boudewyn & Liem, 1995), self-blame (Herpetz, Sass & Favazza, 1997), hopelessness (Milnes, Owens & Blenkiron, 2002), low self-efficacy (Fliege, Kocalevent, Rose, Becker & Walter, 2004), recent critical life events (Portzkey, de Wilde & van Heeringen, 2008), perceived stress (Fliege, Kocalevent, Walter, Beck, Gratz et al., 2006) and lack of coping skills (Brown & Williams, 2007).

A number of adverse childhood experiences have been associated with NSSI. In a systematic review of the literature Fliege, Lee, Grimm and Klapp (2009) reported a number of significant factors including: parental psychological problems, parental separation, early separation from the parent, emotional neglect, emotional abuse, physical abuse and sexual abuse. Although childhood abuse is one of the most commonly cited risk factors for NSSI, there is evidence to suggest that the attachment relationship between parent and child also has important risk implications for later psychopathology (Gratz, 2003) with preliminary evidence suggesting that insecure parental attachment may be independently related to self-injurious behaviour in female college students (Gratz, Conrad & Roemer, 2002).

Particular parental rearing styles have also been found to correlate with self-injurious behaviours (e.g. Marchetto, 2010). Parental rearing styles and associated bonding is assumed to develop according to two orthogonal parenting styles. The first of these pertains to the level of 'care' involved in parenting; that is, the amount of love, warmth and affection exhibited from the parent toward the child. The second relates to parental 'control'; that is, the amount of overprotection and restraint exhibited by the parent. Parental care ranges on a dimension from low (where there is parental coldness and rejection) to high (where there is a lot of expressed love and care), and parental control, from low (where freedom and independence is encouraged) to high (where there is parental prohibition and fostering of dependence). NSSI through skin-cutting has been associated with maternal and paternal control and with low maternal care (Marchetto, 2010), while low parental care has been associated with suicidality (Heider, Bernert, Matschinger, Haro, Alonso et al., 2007) and risk of repetition of suicidal behaviour (Dale, Power, Kane, Stewart & Murray, 2010).

Young (1990) hypothesised that parental rearing and bonding styles in childhood play a key role in the development of core psychological themes he termed ‘early maladaptive schemas’ (EMS). According to Young EMS develop when core emotional needs go unmet in childhood. EMS are comprised of emotions, memories, cognitions and bodily sensations in response to which maladaptive behaviours develop. Young, Klosko and Weishaar (2003) described 18 EMS that can be grouped into ‘schema domains’ which correspond to five broad categories of unmet emotional needs (Young et al., 2003).

Young (1990) argued that adult psychopathology can be traced back to the EMS that develop from unmet childhood needs. EMS and their domains have been associated with a number of conditions including personality disorder (Carr & Francis, 2010), post-traumatic stress disorder (Cockram, Drummond & Lee, 2010), substance misuse (Ball & Cecero, 2001), panic disorder (Hedley, Hoffart & Sexton, 2001), eating disorder (Deas, Power, Collin, Yellowlees & Grierson, 2011), depression (Lumley & Harkness, 2007) and suicidal behaviours (Dale et al., 2010). Four EMS (namely, Mistrust/Abuse, Emotional Deprivation, Social Isolation/Alienation and Insufficient Self-Control/Self-Discipline) have also been shown to differentiate individuals with and without NSSI (Castille, Prout, Marczyck, Shmidheiser, Yoder et al., 2007).

EMS are stable trait-like representations which help to explain how individuals present over time. However, this concept in itself does not fully explain moment-to-moment presentations particularly in reference to BPD in which emotional states can rapidly shift from one extreme to another. Young et al. (2003) developed the ‘schema mode’ concept to explain such clinical observations, allowing a means to better understand current emotional states. Schema modes are momentary emotional states that encompass various EMS and coping responses (Young et al., 2003). Specific EMS are not exclusively connected with individual schema modes and although Young et al. (2003) have noted that in their clinical work some EMS and coping responses tend to group together in certain modes (e.g. Emotional Deprivation, Abandonment and Vulnerability in the Vulnerable Child mode) the specific EMS that are activated in a particular schema mode vary from patient to patient. Therefore, one patient’s Vulnerable Child mode may be predominately governed by the Emotional Deprivation schema while another patient with a Vulnerable Child mode may

experience intense Abandonment during mode activation. Particular schema modes can arise suddenly in response to triggering circumstances to which we are oversensitive and at any given time a particular mode will be predominant while the rest lie dormant (Young et al., 2003). Individuals with psychological problems, particularly those which are characterological in nature, may experience more extreme schema modes with greater mode shifting or ‘flipping’ and less integration between modes.

Fourteen schema modes have been described (Young et al., 2003; Young, Arntz, Atkinson, Lobbestael, Weisheer et al., 2008). The ‘child modes’ include innate experiences we all possess but which are enhanced or inhibited by particular childhood experiences. Maladaptive child modes include: Vulnerable Child (which feels lonely, lost, unlovable, powerless, victimised, unsafe, isolated and/or excluded); Angry Child (which feels angry, frustrated or impatient); the Enraged Child (which experiences intense anger and may appear ‘out of control’); the Impulsive Child (which acts on impulse to achieve short-term goals without consideration of consequences); and Undisciplined Child (which lacks discipline to achieve necessary or desired goals). The only adaptive child mode is Happy Child which feels loved, connected, cared for, safe, self-reliant and optimistic. The ‘maladaptive parent modes’ reflect internalised ‘voices’ from childhood: Demanding Parent (strives to do things the ‘right’ way to achieve perfection and not waste time) and Punitive Parent (blaming, punishing and bullying towards self or others). The ‘maladaptive coping modes’ represent coping mechanisms learned in childhood: Detached Protector (uses psychological avoidance to numb emotions and feel detached); Detached Self-Soother (uses behaviours and activities that numb emotions); Compliant Surrenderer (acts in a way that is passive, submissive, approval-seeking or self-deprecating as a way to avoid conflict, confrontation or rejection); Bully and Attack (directly harms or controls others using aggression, intimidation or coercion); and Self-Aggrandiser (feels special, self-important and superior to others). The final adaptive mode is the Healthy Adult which soothes and nurtures the Vulnerable Child, sets realistic limits for the Angry/Impulsive Child, promotes the Happy Child, neutralises the maladaptive parent modes and eventually replaces the maladaptive coping modes.

There is evidence to suggest that maladaptive schema modes are stronger in individuals with personality disorder pathology relative to non-patient controls and that this finding is particularly evident in individuals with BPD. For instance, Arntz, Klokman and Sieswerda (2005) found that total maladaptive mode score was higher in individuals with BPD compared to those with cluster-C personality disorder and non-patient controls. Lobbestael and Arntz (2010) also reported that people with BPD displayed the highest level of maladaptive schema modes in a sample also containing antisocial personality disorder. In terms of individual schema modes, Young et al. (2003) purported that BPD is characterised by the Punitive Parent, Angry Child, Detached Protector and Vulnerable Child modes and by a weak Healthy Adult mode. This assertion has largely been supported by empirical findings (e.g. Lobbestael, van Vreeswijk & Arntz, 2008). Maladaptive schema modes have also been shown to play a mediatory role between adverse childhood experiences such as abuse and adulthood psychopathology such as dissociation in people with BPD (Johnston, Dorahy, Courtney, Bayles & O’Kane, 2009) suggesting that maladaptive schema modes may be an important mechanism in this relationship. However, to the author’s knowledge no previous research has examined maladaptive schema modes in a NSSI population.

Young (1990) developed ‘Schema Therapy’ as a means of addressing the EMS and schema modes that underlie adult psychopathology. Described as an ‘integrative psychotherapy’ Schema Therapy blends elements of cognitive behaviour therapy, object relations and gestalt therapy into a unified approach. Although initially developed for the treatment of personality disorders Young et al. (2003) has since argued that Schema Therapy is appropriate for the treatment of individuals with a number of complex and chronic psychological conditions. In a recent review of the literature Masley, Gillanders, Simpson and Taylor (2011) reported that there is increasing evidence for the efficacy of Schema Therapy for a variety of disorders including personality disorders, post-traumatic stress disorder (PTSD), substance misuse and eating disorders. Although the evidence-base for Schema Therapy is largest in relation to personality disorders (and in particular BPD), it is clear that clinicians using this model feel it is appropriate to use when a client’s problems are felt to stem from schema-level difficulties. Theoretically, it would be reasonable to assume that Schema Therapy would be appropriate for individuals with NSSI due to

the fact that these difficulties are assumed to have schema-level origins. However, research supporting this assumption has thus far been limited.

The present research aimed to examine for the first time the relationship between parental bonding, maladaptive schema modes and NSSI in a sample of psychiatric outpatients. A number of hypotheses were tested in the current study. Firstly, in line with previous research which suggests that high parental control and low parental care is associated with NSSI and suicidality (Heider et al., 2007; Dale et al., 2010; Marchetto, 2010), it was hypothesised that low parental care and high parental control is associated with an earlier age of onset, longer duration and higher number of methods of NSSI. Secondly, consistent with Young (1990) it was hypothesised that low parental care and high parental control is associated with heightened maladaptive schema modes. Thirdly, given the evidence that heightened maladaptive schema modes are associated with various psychopathology including BPD (Lobbestael et al., 2008) it was hypothesised that greater maladaptive schema modes are positively correlated with earlier age of onset, longer duration and higher number of methods of NSSI. Fourthly, consistent with previous research suggesting that maladaptive schema modes act as a mechanism between adverse childhood experiences and adult psychopathology (e.g. Johnston et al., 2009), it was hypothesised that maladaptive schema modes mediate the relationship between parental bonding (i.e. low parental care and high parental control) and NSSI (i.e. earlier age of onset, longer duration and higher number of methods). Finally, given the conceptual overlap between BPD and NSSI, it was hypothesised that the maladaptive schema modes evident in BPD (namely, Punitive Parent, Angry Child, Detached Protector and Vulnerable Child) also act as individual mediators between parental bonding variables and NSSI outcome variables.

METHOD

Participants

70 participants (57 female; 13 male) with a history of NSSI took part in the study. All were outpatients receiving care from a community mental health team (CMHT). The mean age was 35.03 years (age range 16-65 years) with a standard deviation of 10.17

years. Primary psychiatric diagnoses in the sample included: BPD (n = 20), bipolar affective disorder (n = 13), depressive disorder (n = 13), mixed anxiety and depressive disorder (n = 6), post-traumatic stress disorder (n = 6), schizoaffective disorder (n = 2), avoidant personality disorder (n = 2), generalised anxiety disorder (n = 1), social phobia (n = 1), panic disorder (n = 1), schizophrenia (n = 1), dissociative identity disorder (n = 1), psychotic disorder not otherwise specified (n = 1), avoidant and dependent personality disorder (n = 1) and paranoid personality disorder (n = 1). Where personality disorder was given as a diagnosis it was coded as the primary psychiatric diagnosis. Therefore, of the 70 participants a total of 22 had a diagnosis of personality disorder. A further 15 individuals were approached but chose not to take part in the research, indicating an 82% uptake in the study.

Measures

Deliberate Self-Harm Inventory (DSHI). The DSHI (Gratz, 2001) is a 17 item self-report questionnaire based on the measurement of intentional self-injurious behaviours without suicidal intent. The instrument asks the respondent to rate on both a dichotomous ('yes' vs. 'no') and continuous ('how many times have you done this?') variable how often they have engaged in 16 different types of self-injury. The last item allows the individual to add a method not listed in the questionnaire. Further questions on the DSHI relate to duration of self-injury, the age of onset, the time since last self-injury and whether hospital treatment has been required. The DSHI has been validated in a number of large scale non-clinical (Gratz et al., 2002; Gratz, 2006; Lundh, Karim & Quilisch, 2007; Brown, Williams & Collins, 2007) and clinical (de Klerk, van Noorden, van Giezen, Spinhoven, den Hollander-Gijsman et al., 2011) samples. Psychometric properties of the instrument include high internal consistency, adequate construct, convergent and discriminant validity, and adequate test-retest reliability (Gratz, 2001).

Schema Mode Inventory (SMI). The SMI used in the current study is a 118-item shortened version developed by Lobbestael, van Vreeswijk, Spinhoven, Schouten and Arntz (2010). Participants are required to rate on a six-point scale ('Never or almost never' to 'All of the time') how often they feel or believe a list of statements which correspond to particular schema modes. Examples of statements for each mode

include: Vulnerable Child ('I feel lost'); Angry Child ('I'm angry with someone for leaving me alone or abandoning me'); Enraged Child ('I have rage outbursts'); Impulsive Child ('I act first and think later'); Undisciplined Child ('I don't discipline myself to complete routine or boring tasks'); Happy Child ('I feel loved and accepted'); Demanding Parent ('I don't let myself relax or have fun until I have finished everything I am supposed to do'); Punitive Parent ('I deserve to be punished'); Detached Protector ('I feel nothing'); Detached Self-Soother ('I like doing something exciting or soothing to avoid my feelings'); Compliant Surrenderer ('I let other people get their own way instead of expressing my own needs'); Bully and Attack ('If you let other people mock or bully you, you're a loser'); Self-Aggrandiser ('I feel special and better than most other people'); and Healthy Adult ('I can learn, grow and change').

An overall 'maladaptive' and 'adaptive' mode strength can be derived from the instrument. The mean score on each mode type can also be obtained, allowing schema mode profiles for each participant to be discerned. The shortened SMI has been validated in a large scale study ($n = 863$) of clinical ($n = 236$ Axis II disorder; $n = 136$ Axis I disorder) and non-clinical ($n = 319$) participants. Factor analysis revealed a 14-factor model ($CFI = .98$). The psychometric properties of the shortened SMI include good internal consistencies ($\alpha = .79$ to $\alpha = .96$) and adequate item loadings (all above .40). Mean item loadings per subscale also varied between .53 and .68. Positive intercorrelations were noted for the maladaptive and adaptive modes and test-retest reliabilities of between .65 and .92 were reported ($p < .01$). Moderate construct validity, discriminant and convergent validity were also demonstrated.

Parental Bonding Instrument (PBI). The shortened PBI (Pedersen, 1994) is a 20 item version used in the current study. It is a self-report measure in which participants report the parental rearing styles they experienced in the first 16 years of life. These rearing styles then allow measurement of the amount of perceived 'care' (5 items) and 'control' (5 items) experienced by the participant. Participants are required to rate on a four point scale ('very like' to 'very unlike') the extent to which statements about paternal rearing style are relevant to the way their mother (10 items) and father (10 items) responded to them as children. Scores for each item range from 0 to 3, with

total parental scores for each dimension ranging from 0-30, and higher scores indicative of greater levels of care or control. Examples of care items include: (my mother/father) 'was affectionate to me'; 'appeared to understand my problems and worries'. Examples of control items include: (my mother/father) 'tried to control everything I did'; 'was overprotective of me'. The psychometric properties of the PBI include good internal consistency and test re-test reliability, satisfactory construct and convergent validity (Parker, Tupling & Brown, 1979).

Procedure

This study was conducted following ethical approval from The East of Scotland Research Ethics Service, The Tayside Medical Sciences Centre Research and Development Office and the Clinical Psychology Ethics Committee at the University of Edinburgh. Participants were obtained by asking staff members of seven CMHTs to approach patients with a history of NSSI. Potential participants were provided with an information sheet about the study and asked if they would be happy to be contacted by the researcher who then contacted them by telephone. The participant and researcher met on one occasion to complete the battery of measures listed. Participants were thoroughly debriefed following completion of the study. No participants found the study unduly upsetting.

RESULTS

Nature and Extent of Non-Suicidal Self-Injury

All 70 participants reported a history of NSSI. Age of self-reported onset of NSSI ranged from 3-32 years of age (mean = 15.87; SD = 8.08), duration from 1-45 years (mean = 17.46; SD = 11.21) and the time since last episode of NSSI ranged from 1 to 400 days (mean = 132.53; SD = 158.35). 59% of the sample (n = 37) reported an episode of NSSI within the last month, 72.9% (n = 51) within the last six months and 82.9% (n = 58) within the last year. 61.4% (n = 43) of participants reported that they had harmed themselves severely enough to require hospitalisation or medical treatment.

The most frequently used method of NSSI reported by participants was self-cutting (95.7%), followed by severe scratching (67.1%), head-banging (55.7%), preventing wounds from healing (54.3%), sticking sharp objects into the skin (52.9%), burning with a lighter or match (42.9%), punching self (40%), rubbing glass into the skin (31.4%), burning with a cigarette (25.7%), carving words into the skin (24.3%), self-biting (22.9%), using cleaning products such as bleach on the skin (20%), carving pictures in the skin (17.1%) and rubbing sandpaper on skin (12.9%). A further 40% reported 'other forms' of self-injury on the DSHI. No significant differences were noted on any item between male and female participants or between psychiatric diagnoses.

The DSHI offers a method of measuring NSSI on a number of dimensions. The variables chosen as outcome measures in the current study were: the age of onset, duration and number of methods of NSSI. These variables were chosen because they were felt to be reasonably reliable self-report indicators of NSSI. Although frequency of NSSI has routinely been used as an outcome in previous research, such research has focused on non-clinical populations where the number of episodes of self-injury is easier to recall (e.g. Gratz et al., 2002). In the current sample of individuals with complex mental health problems, participants were unable to accurately report this measure due to the high number of NSSI episodes they had experienced.

Parental Bonding

In order to determine whether maternal and paternal dimensions should be combined on the care and control scales of the PBI two paired samples t-tests were undertaken. On the care dimension, no significant differences were noted between maternal (mean = 5.11; SD = 3.96) and paternal (mean = 4.56; SD = 4.11) care ($t(69) = .93$; $p = \text{ns}$) domains. However, relative to paternal control (mean = 5.53; SD = 3.05), scores of maternal control (mean = 7.06; SD = 3.24) were significantly higher ($t(69) = 3.68$; $p < .01$). Therefore, correlations were undertaken with maternal and paternal care as an amalgamated 'parental care' dimension and maternal and paternal control as separate dimensions.

Correlational Analysis

For the correlational analysis a conservative p-value of .01 was chosen in order to manage the type 1 error rate related to the multiple reported correlations. This method was chosen over the Bonferroni method which is more likely to increase the type 2 error rate. A number of significant associations were noted between NSSI, parental bonding and maladaptive schema mode variables (see Table 1). Partial correlational analysis included age entered as a covariate for exploration of the relationship between predictor variables and duration of NSSI. This method was adopted in order to prevent the confounding effect of age given that longer duration of NSSI may be expected in older participants. For all other analyses bivariate correlations were utilised.

{Insert Table 1 Here}

As can be seen in Table 1 correlational analysis revealed a number of interesting associations. Of particular note is the finding that a longer duration of NSSI was associated with lower parental care and heightened maladaptive schema modes. An earlier age of onset of NSSI was also associated with lower parental care and heightened maladaptive schema modes. In addition, a higher number of reported methods of NSSI was associated with greater maladaptive schema modes. However, no significant relationship was noted between maternal and paternal control with any other variable.

Further correlational analysis was undertaken in order to explore whether individual maladaptive schema modes were associated with NSSI and parental care (see Table 2). This analysis revealed a number of significant associations between individual schema modes and NSSI variables. Specifically, a longer duration of NSSI was associated with heightened Vulnerable Child, Angry Child, Impulsive Child and Punitive Parent modes. An earlier age of onset of NSSI was associated with heightened Vulnerable Child, Angry Child, Impulsive Child, Undisciplined Child, Self-Aggrandiser, Bully and Attack and Punitive Parent modes. Finally, a higher number of methods of NSSI was associated with greater Vulnerable Child, Enraged Child, Impulsive Child and Punitive Parent modes.

{Insert Table 2 Here}

Mediation Analysis

To examine any mediating effects of maladaptive schema modes on the relationship between parental care and NSSI variables (duration, age of onset, number of methods), simple mediation analysis was conducted using total maladaptive schema mode strength scores. According to Baron and Kenny (1986) all variables in a mediation model must be intercorrelated. Significant intercorrelations were noted between duration of NSSI and parental care ($r = -.38$; $p < .01$) and maladaptive schema modes ($r = .51$; $p < .01$), and between the latter two variables ($r = -.35$; $p < .01$). Intercorrelations were also significant between age of onset of NSSI and parental care ($r = .37$; $p < .01$) and maladaptive schema modes ($r = -.58$; $p < .01$). However, the number of methods of NSSI correlated with maladaptive schema modes ($r = .47$; $p < .01$) but not with parental care ($r = -.19$; $p = ns$). Therefore, the third model was not subjected to mediation. Parental control was not explored in mediation analysis because of the lack of significant correlations between this variable and NSSI outcome variables.

The first analysis explored the mediatory effect of maladaptive schema modes between parental care and duration of NSSI. In this analysis age was entered as a covariate. In the mediation model the bootstrapped values of the 95% confidence interval that do not contain zero between their lower and upper limits are considered to be significant mediators (Preacher & Hayes, 2008). Simple mediation analysis of the bias corrected confidence interval (BC CI) at 95% indicated that after controlling for age maladaptive schema modes significantly mediated the relationship between parental care and duration of NSSI (lower BC CI = $-.21$; upper BC CI = $-.05$; $B = -.17$). The mediation model accounted for 46% of the amount of variance in duration of NSSI ($R^2 = .46$) where $F(3,66) = 18.43$ ($p < .01$), representing a medium effect size. This relationship is depicted in Figure 1 below.

{Insert Figure 1 Here}

The second mediation analysis explored the mediatory effect of maladaptive schema modes between parental care and age of onset of NSSI (see Figure 2). Simple mediation analysis of the bias corrected confidence interval (BC CI) at 95% indicated that maladaptive schema modes significantly mediated the relationship between parental care and age of onset of NSSI (lower BC CI = .05; upper BC CI = .19; $B = .11$). The mediation model accounted for 37% of the amount of variance in age of onset of NSSI ($R^2 = .37$) where $F(2,67) = 19.29$ ($p < .01$), representing a medium effect size.

{Insert Figure 2 Here}

Subsequent analyses examined the mediating effect of individual maladaptive schema modes between parental care and NSSI variables (duration, age of onset and number of methods). The individual schema modes explored as mediators were: Punitive Parent, Angry Child, Detached Protector and Vulnerable Child. No significant findings were observed between parental care and any NSSI variable for the Detached Protector and Vulnerable Child modes and no significant mediation between any of the four individual schema modes and the number of methods of NSSI. However, significant mediation was observed for the Punitive Parent and Angry Child modes as outlined below.

Simple mediation analysis of the bias corrected confidence interval (BC CI) at 95% indicated that the Punitive Parent mode significantly mediated the relationship between parental care and duration of NSSI (lower BC CI = -.17; upper BC CI = -.04; $B = -.18$) with age as a covariate. The mediation model accounted for 46% of the amount of variance in duration of NSSI ($R^2 = .46$) where $F(3,66) = 18.86$ ($p < .01$), representing a medium effect size. This relationship is presented in Figure 3 below.

{Insert Figure 3 Here}

Finally, multiple mediation analysis of the bias corrected confidence interval (BC CI) at 95% indicated that the relationship between parental care and age of onset of NSSI was significantly mediated by the Punitive Parent (lower BC CI = .01; upper BC CI = .10; $B = .10$) and Angry Child (lower BC CI = .02; upper BC CI = .15; $B = .10$)

modes. The mediation model accounted for 35% of the amount of variance in age of onset of NSSI ($R^2 = .35$) where $F(3,66) = 11.73$ ($p < .01$), representing a medium effect size (see Figure 4).

{Insert Figure 4 Here}

DISCUSSION

The current study is the first to demonstrate a relationship between maladaptive schema modes and NSSI. Results from correlational analyses support the hypothesis that heightened maladaptive schema modes are significantly associated with a higher number of methods, longer duration and earlier age of onset of NSSI. This finding is consistent with previous research indicating that heightened maladaptive schema modes are associated with various psychopathology including BPD (Lobbestael et al., 2008). Correlational analysis also revealed that NSSI variables were associated with a number of individual schema modes, with the Vulnerable Child, Angry Child and Punitive Parent modes showing significant associations with all three dependent variables in the expected direction. It is also interesting to note that these individual schema modes are implicated in BPD psychopathology (e.g. Lobbestael et al., 2008).

The hypothesis that adverse parental bonding (i.e. low parental care and high parental control) is associated with NSSI variables was partly supported by the research findings. Results revealed that lower parental care significantly correlated with an earlier age of onset and longer duration of NSSI, however, parental care showed no significant association with the number of methods of NSSI. Interestingly, maternal and paternal control showed no significant relationship with NSSI variables. Low parental care has been associated with increased suicidality (Heider et al., 2007) and risk of repetition of suicidal behaviour (Dale et al., 2010), and low maternal care with NSSI through skin-cutting (Marchetto, 2010). Yet, Marchetto (2010) also demonstrated that high paternal and maternal control was associated with NSSI in their sample.

It is unclear why low care but not high control is particularly important in the relationship with NSSI in this study although it may be that it is low care specifically

that plays a role in increased NSSI severity. The results are also consistent with Orbach, Gilboa-Schechtman, Sheffer, Meged and Har-Even (2006) who found that parental care was reported as significantly lower in a suicidal group than in comparison controls, but no significant differences were noted on parental control. Orbach (2007) hypothesised that lack of parental care in childhood is associated with feelings of rejection and abandonment, leading to insecure attachment styles and insufficient healthy coping mechanisms. Although causation cannot be determined given the cross-sectional nature of the current study, Orbach's hypothesis is consistent with the notion that it is lack of parental care rather than parental control that is particularly important in the development of unhealthy coping mechanisms such as NSSI.

Partial support for the hypothesis that low parental care and high parental control are associated with heightened maladaptive schema modes was also obtained from correlational results. Similar to the previous finding, results revealed that paternal and maternal control were not significantly correlated with maladaptive schema modes, but that low parental care was associated with heightened maladaptive schema modes. Low parental care was also significantly correlated with a number of individual schema modes, namely, the Vulnerable Child, Angry Child, Detached Protector and Punitive Parent. It is interesting to note that these schema modes are also the four maladaptive modes noted in BPD (e.g. Lobbestael et al., 2008). That low parental care was significantly associated with maladaptive schema modes is consistent with Young's (1990) assertion that maladaptive schemas develop from adverse experiences in childhood, particularly in relation to attachment experiences with early caregivers. In the clinical practice of Schema Therapy the therapeutic relationship plays a vital role in providing the patient with 'limited-reparenting' in order to heal some of the pain of adverse attachment experiences in childhood. Although healthy boundary setting and structured control are important, it is care that is emphasised as vital in the success of the therapy (Young et al., 2003). The association between parental care and maladaptive schema modes demonstrated in the present study may therefore support key theoretical assumptions in Schema Therapy.

Further partial support was obtained for the hypothesis that maladaptive schema modes mediate the relationship between parental bonding and NSSI variables. Firstly,

due to a lack of significant correlations no evidence could be obtained to support the assumption that maladaptive schema modes mediate the relationship between parental control and NSSI variables. For the same reason the model containing number of methods of NSSI as an outcome variable could not be tested. However, maladaptive schema modes were found to mediate the relationship between parental care and duration of NSSI (Figure 1), indicating that those individuals who report low parental care in childhood also report a longer duration of NSSI, with heightened maladaptive schema modes acting as a mediatory mechanism between these constructs. Maladaptive schema modes also mediated the relationship between parental care and age of onset of NSSI (Figure 2), indicating that low parental care also predicts an earlier age of onset of NSSI, with maladaptive schema modes acting as a mediator in this relationship. Although not confirmatory this evidence is consistent with the notion that people develop maladaptive schema modes in response to low parental care and that this in turn may lead to an earlier age of onset and longer duration of NSSI.

The final hypothesis related to the assumption that the maladaptive schema modes evident in BPD (namely, Punitive Parent, Angry Child, Detached Protector and Vulnerable Child) also act as individual mediators between parental bonding variables and NSSI outcome variables. Partial support was obtained for this supposition with two of the four individual schema modes examined showing significant mediatory roles. Firstly, the Punitive Parent mode mediated the relationship between parental care and duration of NSSI (Figure 3) and between parental care and age of onset of NSSI (Figure 4). The Angry Child mode also mediated the relationship between parental care and duration of NSSI (Figure 4). These findings support the assumption that BPD and NSSI are distinct but overlapping constructs.

That the Punitive Parent and Angry Child modes mediated the relationship between parental care and NSSI is also consistent with theories in the literature about the function of self-injury. In a sample of 243 participants who reported NSSI the majority of respondents believed that their self-injury was a means of expressing emotional pain and anger (Warm, Murray & Fox, 2003). NSSI as a form of self-punishment has also been highlighted by a number of researchers (see Klonsky, 2007 for a review). The self-punishment model of NSSI suggests that self-injury is an

expression of anger or denigration toward oneself. The Punitive Parent mode is also comprised of these self-punitive themes. In a review of the literature, Klonsky (2007) reported that the evidence for NSSI as self-punishment was strong. This finding is consistent with the assertion that individuals who have grown up in invalidating environments learn to punish or invalidate themselves (Linehan, 1993) which is again consistent with the low reported parental care in the sample. The mediatory role of the Angry Child mode is also consistent with research indicating that those with a history of repeated NSSI have higher scores on trait anger than non-repeaters of self-injury (Hawton, Kingsbury, Steinhardt, James & Fagg, 1999) and the finding that anger is a reported risk factor for NSSI (Gratz, 2006).

Although speculative the results of the present study can be interpreted from a Schema Therapy perspective. This perspective would argue that under conditions of low parental care, maladaptive schema modes are strengthened, and that these lead to an earlier age of onset, longer duration and higher number of methods of NSSI. Proponents of Schema Therapy would also argue that the Punitive Parent and Angry Child modes may be particularly salient because these modes have been described as emerging in response to conditions in which core emotional needs are not met (Young et al., 2003). The Angry Child mode may reflect the childhood anger of not being cared for enough by parents and the Punitive Parent mode may reflect the belief that the self is not worthy of care and therefore worthy of punishment, leading to an externalising of self-punishment in the form of NSSI. However, the cross-sectional nature of the present study prevents confirmation of these musings.

Nevertheless, the results of the present study provide preliminary evidence that a Schema Therapy approach may be helpful in individuals with NSSI. Arguably, schema modes may be an appropriate treatment target that could mediate between historical variables and current behaviours. Particular attention toward the role of the Angry Child and Punitive Parent modes in regard to this behaviour may also be helpful. Given that the sample largely consisted of individuals without a diagnosis of personality disorder, this research also supports Young's (1990) assertion that Schema Therapy is a model that can be applied beyond the personality disorder diagnosis, to individuals with other chronic and complex problems.

Strengths of the study include the relatively large sample size which allowed sufficient statistical power to test mediation models. The study was also naturalistic in its decision to explore NSSI using a transdiagnostic approach. The research is also the first of its kind to find support for the relationship between parental bonding, maladaptive schema modes and NSSI, consistent with the Schema Therapy model. The sample chosen to take part in the study was selected from a Tier 3 service which provides support for individuals with severe and enduring mental health problems based within a CMHT. The results from this study can therefore be considered particularly clinically relevant particularly in relation to Schema Therapy which was developed for individuals with more complex presentations.

However, the chronic and complex nature of the presenting individuals in the sample make generalisations to individuals with less severe presentations problematic. This issue may be particularly important given that NSSI is also present in a proportion of the general population (Meltzer et al., 2002). Previous research has also used frequency of NSSI as an outcome measure (e.g. Gratz et al., 2002) but this could not be obtained due to difficulties for participants in the estimation of the number of times they had engaged in self-injury. This can be explained by the fact that the duration of NSSI ranged from one to sixty years, which is in contrast to previous research where samples have generally reported NSSI on less than a dozen occasions (e.g. Gratz et al., 2002). There also remains an issue over the accuracy of self-report measures and whether bias was introduced by way of the selection method. Finally, it is important to highlight that given the cross-sectional and retrospective nature of the study, causal relationships between variables cannot be assumed.

Future research would benefit from further exploration of how schema modes can be mapped in NSSI. It would be particularly interesting to delineate the schema modes experienced prior to, during and after NSSI. Future research could also examine schema mode differences between individuals who self-injure without suicidal intent and those who commit attempted suicide. An exploration of the relationship between schema modes, emotion dysregulation and NSSI would also be helpful. More generally, a clear gap in the literature relates to how schema modes present in populations other than working age adults. Indeed, Videler, van Royen and van Alphen (2012) has called for evidence for Schema Therapy in older adults and there is

preliminary evidence in the literature to suggest that adolescents may benefit from a Schema Therapy approach (e.g. van Vlierberghe, Braet, Bosmans, Rosseel & Bogels, 2010).

To conclude, the results of the present study support the hypothesis that maladaptive schema modes provide a pathway to NSSI from low parental care. The results also indicate that the Angry Child and Punitive Parent modes may be particularly important in NSSI, thereby pointing towards a potential treatment target. These findings provide further support for the theoretical underpinnings of Schema Therapy and suggest the potential utility of this model in the treatment of NSSI.

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Figures & Tables

Table 1. Correlation matrix to show correlation coefficients between the main variables

Variable	1	2	3	4	5	6
1. DSHI (Age of Onset)	—					
2. DSHI (No. of Methods)	-.51*	—				
3. DSHI (Duration)	-.78*	.56*	—			
4. PBI Total Parental Care	.37*	-.19	-.38*	—		
5. PBI Maternal Control	-.08	.01	.14	-.12	—	
6. PBI Paternal Control	.11	-.12	-.05	.27	.22	—
8. SMI Maladaptive	-.58*	.47*	.51*	-.35*	.13	-.06

* p < .01

Table 2. Correlations between individual schema modes and related variables

Maladaptive Schema Mode	DSHI Duration	DSHI Age of Onset	DSHI No. of Methods	PBI Total Care
Vulnerable Child	.36*	-.41*	.36*	-.37*
Angry Child	.40*	-.50*	.27	-.33*
Enraged Child	.25	-.30	.33*	-.05
Impulsive Child	.35*	-.44*	.44*	-.12
Undisciplined Child	.22	-.31*	.25	-.15
Compliant Surrenderer	.20	-.24	.19	-.14
Detached Protector	.09	-.17	.23	-.37*
Detached Self-Soother	.30	-.17	.27	-.09
Self-Aggrandiser	.24	-.38*	.10	-.07
Bully and Attack	.22	-.36*	.16	-.14
Punitive Parent	.50*	-.42*	.47*	-.32*
Demanding Parent	.20	-.29	.18	-.22

* p < .01

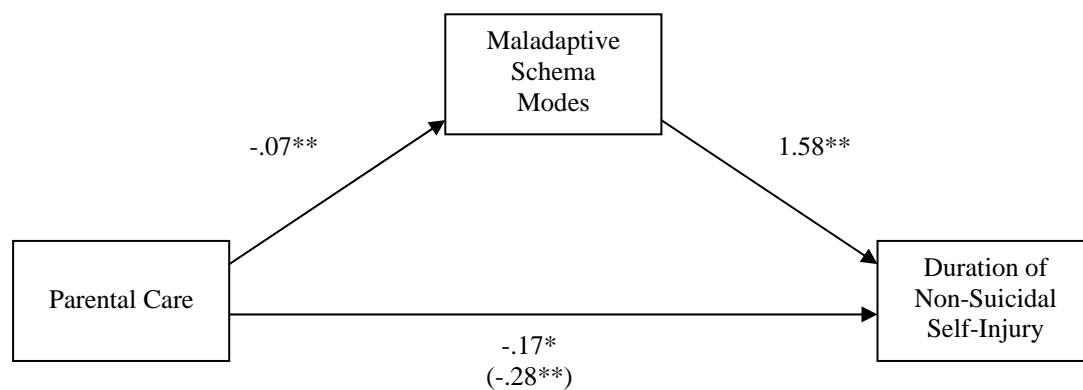


Figure 1. Mediation model of the pathway between parental care, maladaptive schema modes and duration of NSSI. Beta-coefficients and associated p-values (* is p < .05, ** is p < .01) are presented in the diagram. Data in parentheses are paths prior to the proposed mediators.

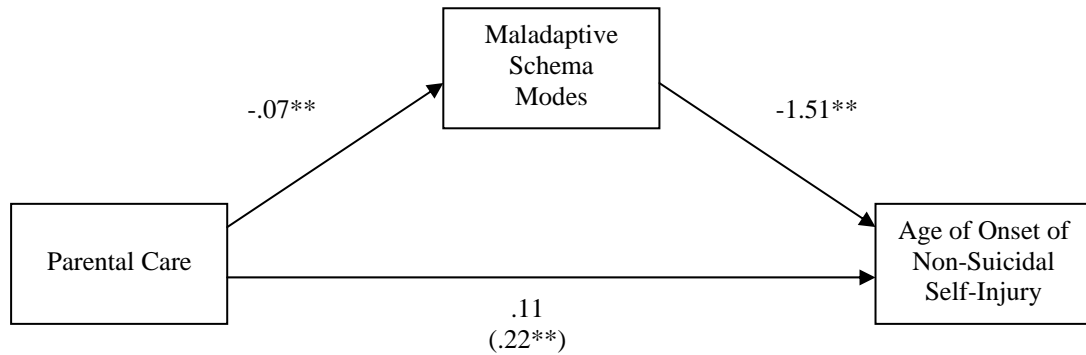


Figure 2. Mediation model of the pathway between parental bonding total care, maladaptive schema modes and age of onset of NSSI. Beta-coefficients and associated p-values (* is $p < .05$, ** is $p < .01$) are presented in the diagram. Data in parentheses are paths prior to the proposed mediators.

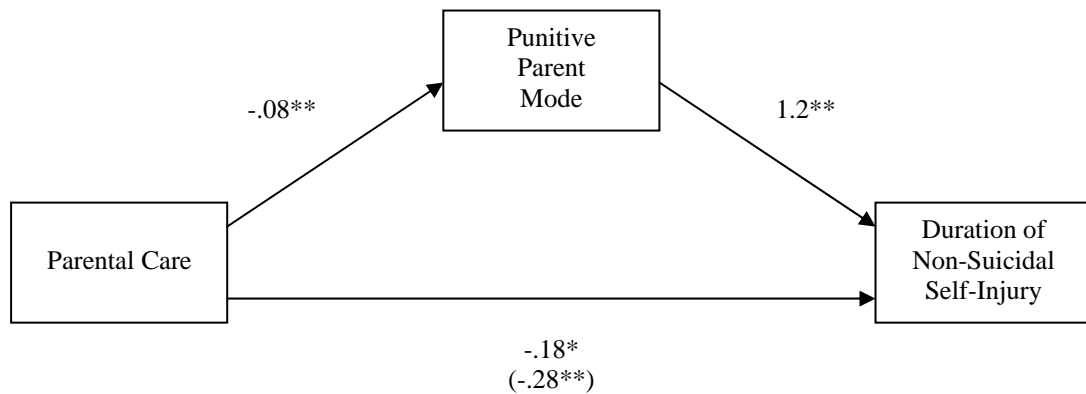


Figure 3. Mediation model of the pathway between parental bonding total care, Punitive Parent mode and duration of NSSI. Beta-coefficients and associated p-values (* is $p < .05$, ** is $p < .01$) are presented in the diagram. Data in parentheses are paths prior to the proposed mediators.

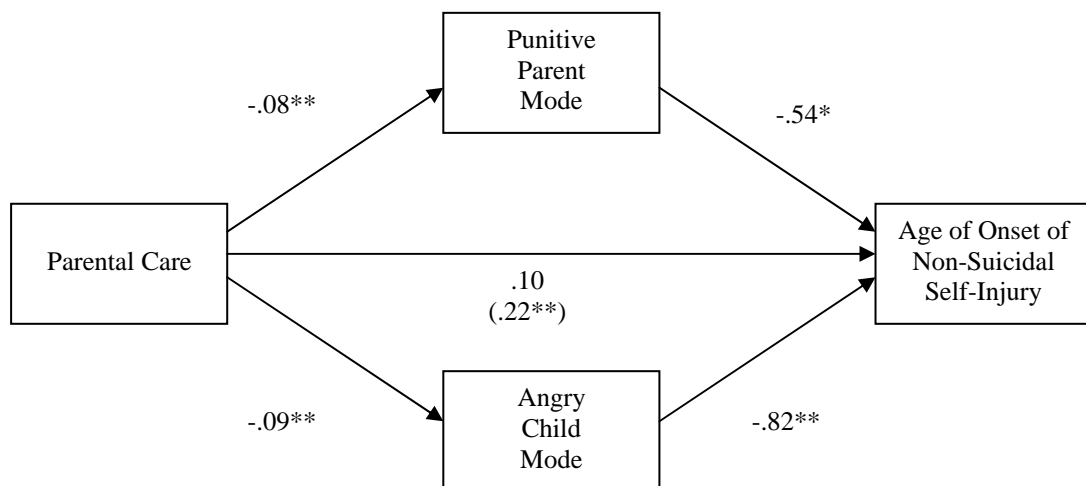


Figure 4. Mediation model of the pathway between parental bonding total care, Punitive Parent and Angry Child modes and age of onset of NSSI. Beta-coefficients and associated p-values (* is $p < .05$, ** is $p < .01$) are presented in the diagram. Data in parentheses are paths prior to the proposed mediators.